REMARKS

Claims 1-30 remain pending in the subject application, with claims 1 and 30 in independent form. Claims 1, 3, 6-7, 19-22, 24-26, and 30 have been amended as described below. There is full support in the specification as originally filed for the amendments. Accordingly, no new matter has been introduced.

The "Finality" of the Present Office Action

The Examiner has marked the present Office Action as a "final" Office Action. The Applicant believes that the finality of the Office Action is premature. The Examiner states that the Applicant's previous amendment necessitated the new ground(s) of rejection. This is not the case. MPEP § 706.07(a) states that second actions on the merits shall be final, except when the Examiner introduces new grounds of rejection that are not caused by the Applicant's amendments to the claims. The previous amendments to the claims were made only for clarification purposes or to correct antecedent basis issues. For example the term "time intervals" was merely changed to "intervals of time". However, the Examiner has proposed new § 112 rejections for claims 3-7 and 10-30 and has even cited new prior art under § 103 against claims 1, 2, 8-10, 19, and 27-29 in the application. The Applicant's amendments to the claims did not necessitate the examiner's rejection based on these new references. **The Examiner had the opportunity to present the current § 112 and § 103 rejections in view of the scope of the claims as originally submitted and did not.**

MPEP § 706.07 also requires that a clear issue be developed between the Examiner and Applicant before a final rejection is in order. Applicant respectfully contends that a clear issue relating to the patentability of the claimed invention has still not been developed. As further stated in MPEP § 706.07, when an examiner switches from one set of references to another to reject claims of substantially the same subject matter in successive actions, the examiner defeats the goal of reaching a clearly defined issue. As stated above, the Examiner has proposed new § 112 rejections for claims 3-7 and 10-30 and, more importantly, has cited new prior art under § 103 against claims 1, 2, 8-10, 19, and 27-29 in the application. Applicant has not had an opportunity to correct

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the new § 112 rejections, traverse the new § 103 rejection, and clearly address issues relating to patentability in which the Applicant and Examiner do not agree. Therefore, it is respectfully requested that the Examiner withdraw the finality of the Office Action and examine the remainder of these remarks on their merits.

Rejections under 35 U.S.C. § 112, Second Paragraph

Claims 3-7 and 10-30 stand rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 3, 6, 7, 19-21, and 24-26 have been amended to clarify antecedent basis issues such that § 112, second paragraph, rejection of these claims is believed to be overcome. The Examiner noted that in claims 3, 6, and 7, there is no prior step of determining the rate "with a derivative..." Claim 1 contained the step "determining the rain rate λ with an equation derived from a point process equation and utilizing n_1 and n_2". When referring to this step in claims 3, 6, and 7, the step was inadvertently referred to as "determining a rain rate λ with a derivative of the point process equation utilizing n_1 and n_2". Therefore, claims 3, 6, and 7 have been amended to reflect the precise wording as it appears in claim 1. The Examiner states that in claim 19, "the digital value", "the digital signal", and "the magnitude component" lack clear antecedent basis. The use of the term "digital signal" was due to a typographical error. Accordingly, claim 19 and paragraph [0019] of the specification are amended to replace the term "digital signal" with "vibration signal". Antecedent basis for the term "vibration signal" is introduced in claim 1. Also, claim 8 provides antecedent basis for the terms "digital value" and "magnitude component". The Examiner also notes antecedent basis issues with claims 20-21 and 23-25. As previously noted, claim 8 provides antecedent basis for the terms "digital value" and "magnitude component". However, claims 20-22 have been amended to refer each claim to the proper parent claim. Claims 24-26 have also been amended to refer each claim to the proper parent claim. Antecedent basis for the term "the enhanced digital value" is provided by the term "each enhanced digital value" introduced in claim 12. Likewise, antecedent basis for "the magnitude component" is provided by "a magnitude component" introduced in claim 8.

The Examiner is unclear as to what "v" represents in claims 10-11. As explained in the previous response, paragraph [0016] of the specification as originally submitted defines "v" as the magnitude component of digital values that are representative of the vibration signal. More specifically, v(n-1) defines a first magnitude, v(n) defines a second magnitude, and v(n+1) defines a third magnitude. Therefore, "v" is the magnitude component which represents the amount of vibration caused by rain falling on the surface.

The Examiner purports error with claim 18 by stating that "'the next largest' appears to refer to that of claim 17, which appears to be incorrect." Claim 18 is a dependent claim referencing claim 17. Claim 17 states an additional step of "determining a next largest enhanced magnitude component in the enhanced series of digital values that is a set time apart from the largest enhanced magnitude component to identify another valid peak." In practicing the method, this step is preferably repeated. Claim 18 explains this repeating with the step of "successively determining the next largest enhanced magnitude component in the enhanced series of digital values that is a set time apart from any of the valid peaks to identify additional valid peaks." Therefore, "the next largest" of claim 18 does refer to "a next largest" of claim 17. The Applicant can find no error with claims 17 and 18.

In claim 30, the Examiner appears to be correct in the assertion that a count of the number of intervals is necessary. Accordingly, claim 30 has been amended to state as such. It is respectfully submitted that the § 112, second paragraph, rejections of claims 1-30 are overcome.

Rejection under 35 U.S.C. § 103(a)

Claims 1, 2, 8-10, 19, and 27 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Lavergnat et al. ("A Stochastic Raindrop Time Distribution Model") in view of Baulin et al. (Union of Soviet Socialist Republics Patent No. 1462182). The Examiner states that Lavergnat et al.

> discloses a stochastic raindrop distribution model which detects the 'pulselike waveform' caused by raindrops falling which generates a signal with peaks and determine the intervals of time between the drops or peaks to establish distributions of interdrop intervals bins which obviously have a first and second

range of intervals of time and then graphing the counts per bin to establish a point process equation based on the counts.

The Examiner further states that Lavergnat et al. fails to teach measuring a vibration signal. Therefore, the Examiner cites Baulin et al. to show a teaching of "measuring raindrop distributions using the vibrations caused by the raindrops in order to count the raindrops." Applicant respectfully traverses the § 103 rejection because the Examiner has failed to establish a *prima facie* case of obviousness.

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. See MPEP § 2143.

Claim 1 of the present invention provides a unique method for determining a rate of rain falling on a surface having the steps of:

- sensing the vibrations of the surface,
- generating a vibration signal proportional to the vibrations of the surface, wherein the vibration signal includes peaks,
- determining the peaks of the vibration signal,
- determining intervals of time between the peaks,
- counting a number n_1 of intervals of time that occur between a first time and a second time and that fall in a first range of the intervals of time,
- counting a number n_2 of intervals of time that occur between the second time and a third time and that fall in a second range of the intervals of time, and
- determining the rain rate λ with an equation derived from a point process equation utilizing n_1 and n_2.

As originally described in paragraph [0006] of the application, the present invention distinguishes itself over the prior art by differentiating between vibrations of the surface caused by rain and those caused by non-rain disturbances when determining the rain rate. It should be clear that the purpose of using the equation derived from a point process equation to determine the rain rate is necessitated by the non-rain disturbances which, along with rain itself, can cause the vibrations on the surface. However, since the Examiner continues to maintain an obviousness rejection, claim 1 has been amended to

further clarify the uniqueness of the claimed invention. To this end, the word "and" has been removed from the final clause of the claim to further convey the uniqueness of determining the rain rate with an equation derived from a point process equation utilizing n_1 and n_2.

Even if one assumes that the prior art cited by the Examiner is combinable, Lavergnat et al. and Baulin et al. together fail to disclose, teach, or suggest all of the claim elements of claim 1.

Lavergnat et al. does not disclose, teach, or sugeest the step of sensing the vibrations of a surface. Furthermore, Lavergnat et al. does not disclose, teach, or suggest the step of determining a rain rate with an equation derived from a point process equation utilizing n_1 and n_2 as defined in independent claim 1 of the present application. Instead, Lavergnat et al. discloses determining intervals of time between rain drops using an optical disdrometer, counting these intervals of time, and establishing a long-term temporal model of rainfall comprising interdrop time intervals and droplet sizes. Lavergnat et al. then applies this model to predict total fallen-water height at a location and for converting between various traditional rain gauge integration times (often used in the telecommunication industry).

Baulin et al. does not does not disclose, teach, or suggest the step of determining a rain rate with an equation derived from a point process equation utilizing n_1 and n_2 as defined in independent claim 1 of the present application. Baulin et al. also fails to disclose the step of sensing the vibrations of a surface. Instead, Baulin et al. sets forth a sensor having an emitter for generating an acoustic field and a detector for receiving the acoustic field. Raindrops falling between the emitter and the detector are then detected. However, Baulin et al. does not disclose, teach, or suggest sensing vibrations of a surface caused by raindrops falling on the surface.

Because Lavergnet et al. and Baulin et al. both do not sense vibrations on a surface, they are not focused on and clearly don't disclose, teach, or suggest using an equation derived from a point process equation for determining the rain rate while differentiating vibrations caused by rain from vibrations caused by non-rain events.

Since Lavergnat et al. and Baulin et al. fail to disclose, teach, or suggest the steps described above and required by independent claim 1, the Examiner has not met the

burden required to appropriately establish a *prima facie* case of obviousness in claim 1. Accordingly, it is respectfully submitted that the § 103 rejection of independent claim 1 is overcome and that this claim is allowable.

Furthermore, as to the rejection of claim 2, the Examiner states that Figure 2a of Lavergnat et al. "show[s] the counts per bin of interdrop time intervals which implies a span." Claim 2 includes the step of "maintaining the first range and the second range of intervals of time <u>equal</u> in a time span w." Lavergnat et al does not disclose, teach, or suggest that the bins have equal time spans. Rather, the bins displayed in Figure 2a appear to have <u>unequal</u> time spans as they are presented on a logarithmic scale. Therefore, it is respectfully submitted that the § 103 rejection of dependent claim 2 is overcome and that this claim is allowable.
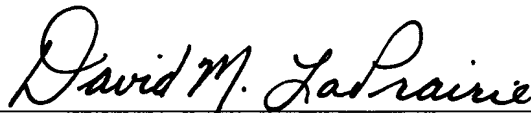
The remaining claims, specifically claims 3-29 depend, either directly or indirectly, from claims 1 and 2, such that these claims are also allowable.

It is respectfully submitted that the Application, as amended, is now presented in condition for allowance, which allowance is respectfully solicited. The Commissioner is authorized to charge our Deposit Account No. 08-2789 for any fees or credit the account for any overpayment.

Respectfully submitted,

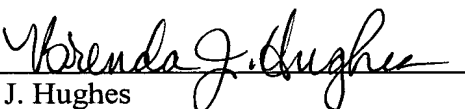HOWARD & HOWARD ATTORNEYS, P.C.

Dated: <u>August 17, 2004</u>

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Brenda J. Hughes

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